wright, and to the officials of the Red Cross Line and Reid-Newfoundland Companies. The four intramercurial lenses were loaned to the Lick Observatory by the Harvard College Observatory, and the five-inch lens of forty-one feet focal length by the Princeton Observatory.

Through the courtesy of Governor MACGREGOR and Commodore PAGET, all the assistants were enabled to leave for St. Johns immediately after the eclipse on either the "Scylla" or the "Fiona," so that by 11 o'clock of the eclipse morning Mrs. CURTIS and the writer were the only outsiders left in Cartwright. The "Virginia Lake" was so delayed by fog and stormy weather that it was sixteen days after the eclipse, on September 15th, before we finally left Cartwright. The first snow of the winter was then lying on its hills.

The limits of a scientific article forbid more than a mention of the novel and interesting features of life on the Labrador, the packs of wolfish Eskimo dogs, the simple "liveyeres" with their soft and pleasant speech in the quaint dialect of Devon, the sturdy fishermen from Newfoundland, and the great work which Dr. GRENFELL is doing for his chosen people on this cruel coast. Of all these and of the workings of the great two-hundred-year-old Company, whose history is that of the whole Northland, we saw and learned much, and closed our two months' sojourn with nothing but regret at leaving the pleasant associations formed while on the Labrador.

VARIABLE SPOTS ON THE MOON.

BY W. H. PICKERING.

In number 104 of these *Publications* (p. 149) a paper is published under the above title. The author apparently does not recognize the fact that excepting in the case of specular reflection the angles of incidence and of reflection are usually unequal. The variable spots upon the Moon which have been most carefully studied are those of Eratosthenes and Alphonsus, both of which are near the center of the disk. The line of sight

is therefore nearly perpendicular to the reflecting surface under all circumstances, and the angle of reflection is zero. The angle of incidence, on the other hand, varies with the phase of the Moon, and it is necessary to explain the following facts: First, when the Sun is just rising on these craters, and for a day or two later, when the angle of incidence is still large, but little contrast is shown on the surface. Second, when the Moon is full, and the angle of incidence is reduced to zero, the variable spots become conspicuously dark, and the contrast between them and the rest of the surface is strongly marked.

If your correspondent will take the piece of white cardboard with the pieces of black paper pasted on it, to which he refers, and place it in the darkened room so that its surface shall be perpendicular to his line of sight, he will then be able to repeat his experiment under proper conditions. He must now show, first, that when the angle of incidence is small, and the ray of light is nearly perpendicular to the surface, the contrast between the paper and cardboard is strongly marked. Second, without altering his own position or moving the cardboard he must change the direction of the light so that it shall strike the cardboard obliquely, and he must now show that the contrast between the cardboard and black paper has disappeared. If he succeeds, he will doubtless let us know, and he will then have furnished a novel solution to a very difficult problem in selenography.

Your correspondent further explains the fact that a given region near the terminator is darker than the same region at full moon, by the presence of the shadows due to irregularities of the lunar surface. While the shadows produce a certain limited effect in this direction, the main reason of the difference of brightness is due to the variation of the angle of incidence. At full Moon the region is more brightly illuminated. This experiment your correspondent can also try for himself with a smooth ball.

October 27, 1905.